

Cyclical Dynamics in Economics and Politics in the Past and in the Future

Grinin, Leonid; Devezas, Tessaleno C.; Korotayev, Andrey

Veröffentlichungsversion / Published Version
Sammelwerksbeitrag / collection article

Empfohlene Zitierung / Suggested Citation:

Grinin, L., Devezas, T. C., & Korotayev, A. (2014). Cyclical Dynamics in Economics and Politics in the Past and in the Future. In L. Grinin, T. C. Devezas, & A. Korotayev (Eds.), *Kondratieff Waves: Juglar – Kuznets – Kondratieff; Yearbook* (pp. 5-24). Volgograd: Uchitel Publishing House. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-58891-2>

Nutzungsbedingungen:

Dieser Text wird unter einer Basic Digital Peer Publishing-Lizenz zur Verfügung gestellt. Nähere Auskünfte zu den DiPP-Lizenzen finden Sie hier:
<http://www.dipp.nrw.de/lizenzen/dppl/service/dppl/>

Terms of use:

This document is made available under a Basic Digital Peer Publishing Licence. For more Information see:
<http://www.dipp.nrw.de/lizenzen/dppl/service/dppl/>

Introduction

Cyclical Dynamics in Economics and Politics in the Past and in the Future^{*}

*Leonid E. Grinin, Tessaleno C. Devezas,
and Andrey V. Korotayev*

Nikolay Kondratieff is known primarily for his theory of long cycles. However, it is worth recalling that he was among the first who started to investigate the nature of different economic cycles and their systematic interaction. Actually the primary classification of cycles into short, medium and long belongs to Kondratieff.

In 1922, in his book *The World Economy and its Conjunctures during and after the War* Nikolay Kondratieff formulated for the first time the basic tenets of the theory of long cycles (Kondratieff 1922 [2002]). As until that time the economic literature hardly knew any other cycles than the ones with a characteristic period between 7 and 11 years (which were called industrial, commercial, and so on), Kondratieff quite logically called them ‘short cycles’ (*Ibid.*: 323). However, already in 1925, in the *Long Cycles of Conjuncture* (Kondratieff 1925 [1993]: 25–26), he began to call the same cycles as ‘medium cycles’.¹ Why? The fact is that in those years Kitchin (1923) discovered some cycles (with a characteristic period between 3 and 4 years) manifested in fluctuations in inventories that could be denoted as truly ‘short cycles’. Later, they became known as ‘Kitchin cycles’. Due to the fact that the medium-term cycles often have internal ups and downs, a group of scientists in the Harvard School headed by Wesley Mitchell started to consider cycles statistically (not by their logic, but by the presence of recessions, from a recession to another recession, regardless of the point that different recessions may be significantly different as regards their strength and nature). As a result, they also detected some cycles with a period between 3 and 4 years (which to a certain extent coincided with Kitchin cycles).

^{*} This research has been implemented as part of the Basic Research Program at the National Research University Higher School of Economics (HSE) in 2015 and supported by the Russian Foundation for the Humanities (Project No 14-02-00330).

¹ By the way, Kondratieff seems to be the first economist to call those cycles ‘medium-term’.

Some years later, Simon Kuznets discovered construction cycles lasting from 17 to 30 years (Kuznets 1930). Thus, in the 1920s and 1930s one could observe within Economics the formation of the idea of a whole system of economic cycles.

At that time it was logical to consider different cycles as having a single and common nature. Such an attempt was made by Joseph Schumpeter in his monograph *Business Cycles* (Schumpeter 1939). However, due to the fact that he tried to consider the structure of long waves to be identical with the structure of the medium-term cycles, his attempt to create a general theory of cycles failed. Note, on the other hand, that it is due to Schumpeter that the medium-term cycles are known now as 'Juglar cycles', whereas the long-term cycles are denoted now as 'Kondratieff waves'.

The Great Depression intensified the economists' interest in cyclical dynamics. As Gottfried Haberler (1964 [1937]) noted, never before in the history of economics the issue of economic cycles had been studied so hard. Haberler himself, before the World War II and on the instructions of the League of Nations, compiled an exhaustive analysis of all the theories of business cycles, but he was skeptical about the idea of long cycles.

However, the emergence of the Keynesian theoretical framework moved economists' attention to other aspects. On the one hand, Keynesian ideas contributed to the understanding of the internal predisposition of the capitalist economy to recession and booms (*i.e.*, cycles), but on the other hand, the attractiveness of the opportunity to influence the course of cycles through public policies has led to the fact that economic thought became focused mainly on these kinds of instruments, and the problems of the nature and the root causation of cyclical changes gradually went to the periphery of economic science.

This was facilitated by the fact that in the second half of the 20th century (especially at the upswing phase of the fourth Kondratieff wave in the 1950s and 1960s) the flow of cycles significantly changed (primarily under the impact of active influence on the economic situation).²

The recessions ceased to be as deep as before. Not surprisingly, the researchers began to pay more attention to such issues as monetary regulation rather than to Juglar cycles.

Such disregard of the study of Juglar cycles is, of course, counterproductive. In our opinion, the current crisis is in many respects rather similar in type to the classic crisis as an integral part/phase of Juglar cycles.³

² For a more detailed analysis of post-World War II cycles see Grinin and Korotayev 2010, 2014a.

³ Fast, sometimes explosive booms (that produced a huge strain on the economy), and then even more precipitous busts were typical of the industrial cycles of the 19th and the beginning of 20th centuries (for more detail see Grinin and Korotayev 2014a; Grinin 2012; Grinin, Korotayev and Malkov 2010; Korotayev and Grinin 2012).

Yet, the investigations of long cycles continued, especially in the period of K-wave downswing in the 1970s and 1980s, when substantial research based on Schumpeter's ideas was performed (*e.g.*, Mandel 1975, 1980; Gordon 1978; Mensch 1979; van Duijn 1979, 1981; Barr 1979; van der Zwan 1980; Marchetti 1980, 1986; Eklund 1980; Kleinknecht 1981; Senge 1982; van Ewijk 1982; Glismann *et al.* 1983; Cleary and Hobbs 1983; Dickson 1983; Bieshaar and Kleinknecht 1984; Freeman 1987). But although very prominent scientists such as Forrester, Rostow, or Wallerstein sometimes concerned the topic (Forrester 1978, 1981; Rostow 1975, 1978; Wallerstein 1984), on the whole this area has never been among the top issues on economic thought. Nevertheless, the interest in this process continues, a new surge of interest has been associated with the work of Devezas and his colleagues (Devezas and Corredine 2001, 2002; Devezas, Linstone and Santos 2005; Devezas 2010).

We believe that the poor use of the theory of long waves limits the ability of forecasting the future of technological change. It is worth noting here that most of the studies that forecast the future development of nano- and biotechnologies, robotics, and so on, unfortunately, do not rely on major theoretical concepts. A significant part of the exceptions is constituted by the studies based on the relation between long waves and technological paradigms. This approach is based on the fact that each new wave (of 50–60 years long) corresponds to a significant shift to a new technological paradigm.⁴ The third section of this Yearbook, which is devoted to the sixth Kondratieff wave and related technological breakthroughs, demonstrates it quite well.

The article by **Leo and Simone Nefiodow** ('The Sixth Kondratieff. The Growth Engine of the 21st Century') introduces a method that is able to predict Kondratieff cycles in their early phase and describe them in ever-greater detail during their further development. This method was first published in 1996 (Nefiodow 1996). The authors believe that the fifth Kondratieff shaped economic events during the 1990s, and the new, sixth Kondratieff, is still in its early stage. This wave became possible because of the start of the formation of a new technological paradigm (new medical technologies and biotechnologies) whose development we have been observing during the last two decades. The Nefiodows believe that these are the technologies that will become the core of the new paradigm. At the same time they argue that psychosocial health (which, according to the authors, cover not only psychotherapeutic and psychiatric services, but also numerous measures of people's health improvement), will be the second leading way of the sixth K-wave.

⁴ See Mensch 1979; Kleinknecht 1981, 1987; Dickson 1983; Dosi 1984; Freeman 1987; Tylecote 1992; Glazyev 1993; Maevski 1997; Modelski and Thompson 1996; Modelski 2001, 2006; Yakovets 2001; Freeman and Louçã 2001; Ayres 2006; Kleinknecht and van der Panne 2006; Dator 2006; Hirooka 2006; Papenhausen 2008; see also: Lazurenko 1992; Glazyev 2009; Polterovich 2009; Perez 2011).

Leonid and Anton Grinin ('The Sixth Kondratieff Wave and the Cybernetic Revolution') differ from the Nefiodows, as they maintain that the sixth Kondratieff wave has not yet started – it will rather begin in the 2020s. The authors, based on their theory of production principles and production revolutions, reveal the interrelation between K-waves and major technological breakthroughs in history (for more detail about the latter see Grinin 2007a, 2012; Grinin and Grinin 2013). They make forecasts about the features of the sixth Kondratieff wave and its forthcoming technological paradigm in the light of the Cybernetic Revolution which, from their point of view, started in the 1950s. They assume that the sixth K-wave in the 2030s and 2040s will merge with the final phase of the Cybernetic Revolution (which they call the phase of self-regulating systems). According to them, this period will be characterized by a breakthrough in medical technologies, which will be capable to combine many other technologies into a single complex of MBNRIC-technologies (medico-bio-nano-roboto-info-cognitive technologies).

* * *

No matter how attractive the idea of linear progress (that was actively developed after the second half of the 18th century [Nisbet 1980]) could be, it has become apparent that the world evolves in a non-linear pattern. And among these nonlinear phenomena the cyclical movements of various forms constitute one of the most common patterns.

It is obvious that the qualitative innovative motion toward new and unknown forms, levels, and volumes, *etc.* cannot continue endlessly, linearly and smoothly. It always proceeds with limitations, accompanied by the emerging imbalances, increasing resistance to environmental constraints, and competition for resources, *etc.* These endless attempts to overcome the resistance of environment created conditions for a more or less noticeable advance in particular societies. However, the relatively short periods of rapid growth (which could be expressed as a linear, exponential or hyperbolic trend) tended to be followed by stagnation, different types of crises and setbacks, which created complex patterns of historical dynamics, within which the trend and cyclical components were usually interwoven in rather intricate ways (see, *e.g.*, Grinin and Korotayev 2012a; Grinin, Korotayev, and Malkov 2010; Korotayev and Grinin 2012, 2014).

Thus, we have observed in history a constant interaction of cyclical and trend dynamics, including some very long-term trends (*e.g.*, Korotayev 2006; Korotayev and Khaltourina 2006; Korotayev, Malkov, and Khaltourina 2006; Korotayev, Komarova, and Khaltourina 2007).

The cyclical dynamics were noticed very long ago. Already the ancient historians (see, *e.g.*, the second Chapter of Book VI of Polybius' *Histories*) described rather well the cyclical component of historical dynamics, whereas new interesting analyses of such dynamics also appeared in the Medieval and Early

Modern periods (see, *e.g.*, Ibn Khaldūn 1958 [1377], or Machiavelli 1996 [1531]).

Although Kondratieff himself considered long waves as primarily an economic phenomenon,⁵ however, the theory of long waves became very actively developed in connection with their political and geopolitical aspects (*e.g.*, Goldstein 1988; Modelski 1987, 2006, 2012; Modelski and Thompson 1996; Devezas 2006). The ideas of long and super-long political cycles are also widely used in the world-system theory (*e.g.*, Chase-Dunn and Grimes 1995).

In the present Yearbook, the political aspect of Kondratieff waves (often in a very close connection with their technological and economic dimensions, as for example, in William Thompson's contribution) is the subject of several articles in the second section.

As **William Thompson** notes in his article ‘K-Waves, Technological Clustering, and Some of Its Implications’, the Kondratieff waves mean many things to different people. Thompson proposes that we would all benefit from adopting a view that considers these long-term fluctuations as instances of technological clustering. Thompson borrows the term ‘technologically clustering’ from Gruebler (1998: 117) who refers to a technological cluster as a ‘set of interrelated technological and organizational innovations whose pervasive adoption drives a particular period of economic growth, productivity increases, industrialization, trade, and associated structural changes’. If we were to converge on this technological clustering as the central focus of K-wave analysis, as a number of analysts do, the significance and centrality of these processes would become more salient, the need to elaborate our theoretical infrastructures would become more imperative, and the unification of many findings pointing in different directions might become more feasible. In other words, the potential payoffs could be efficient. Thompson attempts to advance the case for this approach by empirically elaborating some of the implications for technological clustering and world inequality reinforcement and systemic leadership decline. Earlier cases have been made for explaining the North-South income gap in terms of uneven technological diffusion (Thompson and Reuveny 2010) without being able to demonstrate fully the contours of the uneven diffusion. A relatively new dataset developed by Comin and Hobijn (2009) facilitates a more direct examination of this phenomenon. At the same time, uneven technological

⁵ On the other hand, Kondratieff noted that ‘it is during the period of the rise of the long waves, that is during the period of high tension in the expansion of economic forces, that, as a rule, the most disastrous and extensive wars and revolutions occur’ (Kondratieff 1935: 111). He also emphasized that ‘wars originate in the acceleration of the pace and the increased tension of economic life, in the heightened economic struggle for markets and raw materials, ...social shocks happen most easily under the pressure of new economic forces. Wars and revolutions, therefore, can also be fitted into the rhythm of the long waves and do not prove to be the forces from which these movements originate, but rather to be one of their symptoms. But once they have occurred, they naturally exercise a potent influence on the pace and direction of economic dynamics’ (*Ibid*).

clustering within the principal source of innovation, the leading economy, also helps explain the puzzles of the relative decline of the incumbent system leader.

Brian J. L. Berry and Denis J. Dean ('Long Waves in American Politics. Part One: Takeoff Presidencies') explore the relationships between long waves and cyclicalities in American politics. Particular attention is paid to 'takeoff presidencies', as modeled by Edward Jayne. These presidencies occurred in the decade following a long-wave trough and brought with them visions of liberty that have negated the preceding vision. The question is raised as to whether the Obama presidency, occurring in the same long wave phase as previous takeoff presidencies, will bring yet another redefinition of liberty to America.

Euel Elliott and Brian J. L. Berry ('Long Waves in American Politics. Part Two: The Obama Question') contend that Barack Obama, committed to ideas of social justice, has attempted to transform the United States into a European-style welfare state via taxation, regulation and legislation, in particular the Affordable Care Act ('Obamacare'), a medical insurance system that 'de facto' is nationalizing one-sixth of the nation's economy. But a slowing economy, mounting unemployment, and increasingly powerful central bureaucracy caught up in spying and other scandals and a disastrous launch of Obamacare, are producing a rising tide of resistance and a reaffirmation of individual rights guaranteed by the Constitution. If Obama prevails he will be hailed as another take-off president. If his initiatives could be overwhelmed by opposition forces, the effect will restore and strengthen constitutional guarantees that are currently under attack.

Jonas Van Vossle ('Long Waves of Political Contestation') develops a wave theory of political contestation, and places the current economic and political turmoil within a historical perspective. Based on legitimacy, it serves as an alternative to Samuel Huntington's (1991) waves of democratization. The theoretical framework is based on two main theories: the theory of long waves in political economics and the theory about state-legitimacy and fiscal crisis. In the first section, this paper gives a short overview of different economic dynamics which over time have been incorporated in long wave theories, predominantly based on the works of Kondratieff (1979) and Schumpeter (1939), and puts the current economic situation in this perspective. The second part analyzes the general interdependency between long waves and politics, and the original criticisms of the endogenous model by Trotsky (1923). The third section analyzes the long-waves theories in politics, in particular Samuel Huntington's theory, and discusses the main criticisms to his theory. The fourth section analyzes the influence of the long wave upswing and downturn on state-legitimacy, and is based on the works of O'Connor (2001) and Habermas (1975). The fifth section combines the long wave's concept with legitimacy and protest against a long wave theory of political contestation and gives the first

elements of some empirical evidence, comparing the political contestation in the thirties and today.

Peter Herrmann ('Indicators – More than Evidence and Maths') considers the important sociopolitical aspect of K-waves related to poverty dynamics. Work on conceptualizing and measuring poverty is widespread. Looking at the literature we can make out some form of cycles from different perspectives on the topic, oscillating between issuing poverty as a very general matter, on the one hand, and concentrating on very specific problems on the other hand, as for example, poverty of certain groups or the consequences of living in poverty. While, of course, attention is frequently paid to the connection between poverty and economic development, little consideration is given to the link between poverty and large cycles of capitalism represented by Kondratieff waves. Herrmann's contribution is devoted to theoretical investigation of this matter. This means as well that certain aspects of empirical approaches are critically investigated. The aim is to problematize some philosophical and methodological aspects of quantification/mathematization, equivalence principle and claim of exchangeability, individualization and, finally, evidence.

Stephen I. TERNYIK ('World System Energetics') notes that human societies are evolving as energy transduction systems and the biophysical flow of energy in a socio-economic system 'quantizes' the flow of time and drives temporal acceleration. The decisive role of money in a monetary production economy is highlighted as temporal access to energy. The greater the natural energy input for productive output, the higher the economic wave frequency and the shorter the wave length. A singularization of human history, which is a replacement of long wave patterns, depends in the nearest future on the technical achievement of a relatively constant energy input. According to the basic formulae of the Snooks – Panov curve, a significant quantum change of the temporal flow will take place in the next decade; it is an open mathematical guess and an ongoing human intelligence test, if this temporal turning point is of discrete or continuous nature.

* * *

As to the subtitle of this volume, it should be noted that many of the contributors anyway speak about the system of cycles and the fact that real economic cycles make up a system, whereas among different types of cycles, the Juglar, Kuznets, and Kondratieff cycles are of utmost importance for the current economic dynamics. In this connection, it might be useful to make a small historical digression.

For a long time, the cyclical nature of economic development was not traced or was indiscernibly weak and irregular.⁶ This is not surprising. We be-

⁶ However, in complex agrarian systems one could detect rather regular socio-demographic cycles (see, e.g., Grinin 2007; Grinin and Korotayev 2012b; Korotayev 2006, 2007a, 2007b; Nefedov

lieve that the cyclical effect in economy appears only with the emergence of regular extended reproduction (first, in the financial and trade sector, and then in manufacturing). It would be useful to give a brief summary of the origin of cyclical dynamics in the modern economy.

It is no coincidence that the first manifestation of long-wave economic dynamics coincided with the industrial revolution of the 1780s. We can assume that the transition to the machine industry actually created the phenomenon of K-wave in economy (or at least allowed defining them clearly enough).⁷

The point is that in that period the productive forces began to acquire a new fundamental property consisting in striving for a steady and continuous expansion. The emergence of this property brought about various forms of cyclical dynamics connected with various limitations that hinder such an expansion and attempts to overcome them. This forward movement, of course, could not be uniform, and had to obey different rhythms; their common property was the alteration of acceleration and deceleration phases caused by the exhaustion of available resources for growth, market saturation, reduced profit margins and so on.

Those rhythms were already present in the development of trade in the 18th century. The emergence of the first K-wave at the final phase of the Industrial Revolution meant the origin of the first form of cyclical dynamics that was specific for the industrial production principle. The completion of the Industrial Revolution in Britain and consolidation of the extended production pattern were marked by the emergence of a new and more explicit form of cycling – the medium-term cycles (ending with cyclical crises). The first such cycle can be dated to 1818–1825. It is rather symptomatic that the first medium-term economic cycle in history happened after the completion of the upswing phase of the first K-wave. There is every reason to believe that K-waves may be fully realized only through the medium-term cycles, as summarized depressions of medium-term cycles determine the overall downward trend at B-phases of a K-wave, whereas aggregated booms of medium-term cycles determine the upswing dynamics of K-wave A-phases (see Grinin 2010, 2013; Grinin and Korotayev 2012b, 2014b; Korotayev and Grinin 2012 for more detail).

Thus, both the Kondratieff long waves and the medium-term Juglar cycles are associated with the same fundamental change – with a transition to a new

2004; Turchin 2003, 2005a, 2005b; Turchin and Korotayev 2006; Turchin and Nefedov 2009; Korotayev and Khaltourina 2006; Korotayev and Komarova 2004; Korotayev, Komarova, and Khaltourina 2007; Korotayev, Malkov, and Khaltourina 2006; Korotayev *et al.* 2011; Korotayev, Malkov, and Grinin 2014).

⁷ In any case, most researchers agree with this dating, though there are ones who find long waves in prices (and not only in prices) starting from the 12th (or even 10th) century (see, *e.g.*, Goldstein 1988; Modelski and Thompson 1996; Modelski 2006, 2008, 2012; Mogeý 1992; Pantin 1996; Pantin and Lapkin 2006).

pattern of production development, that is an extended reproduction based not only on the involvement of new resources (this also had happened within complex pre-modern agrarian systems), but on the economic growth through regular investments, innovations and improvements. In other words, the relationship between the long and medium-term cycles, on the one hand, and the tendency of the contemporary productive forces toward the continued expansion, on the other, has a common denominator, which includes innovations as an important component. Hence, it is evident that both types of economic cycles are associated with a longer (and deeper) cyclic change in the productive forces – the production revolution that leads to the movement from one production principle to another (Grinin 2007b).

The year 1825 was the year when a typical cyclic crisis of the Juglar type engulfed for the first time the whole British economy and part of the other countries' economy. It was preceded by the rise of enterprise, investment, and speculation, which in 1824 and early 1825 grew into a real boom (see Grinin and Korotayev 2012a for more details). The crises that took place in industry before 1825 were not universal, they were connected with certain problems in trade caused by various factors (inflation, wars and so on). As mentioned above, Schumpeter named such classical cyclical industrial crises that emerged in the early 19th century after the French economist Klement Juglar.

The researchers of medium-term cycles and crises of the 19th century often paid much attention to the crises of the 18th century finding them very instructive, and most importantly, largely similar to those observed in the 19th century. Indeed, the similarities (excitement, excessive lending, unexpected bankruptcies, credit crunch, panic and bust) are clearly visible. And it is no coincidence since a number of necessary elements for economic cycling (of course, except for a system of industrial machine production that dramatically increased the supply of goods to the market) had been already formed at that time.

As has been mentioned above, the imperative of continuous expansion of economic turnover was forming. Therefore, cyclicality (inherent in the industrial production principle) was substantial. The role of credit also increased. And since the mid-term cycles and crises are associated with fluctuations in credit, a certain prototype of medium-term cycles (with a characteristic period of about 10 years) can be observed in the 18th century, especially in its second half (see Hansen 1951; Braudel 1973).

In 1763, a crisis started in Hamburg against the background of the depreciation of currency during the Seven Years' War, but then as a result of the huge bankruptcy of de Neufville brothers in Amsterdam, this crisis acquired a pan-European character (Wirth 1877, 1883; Braudel 1973). Then there happened the crisis of 1772–1773, which took place against the background of severe crop failures of 1771–1772 and, like the previous one, included a large bankruptcy (the Cliffords bankruptcy of December 1772, which became the detona-

tor of collapse). Finally, the crisis of 1780–1783 also acquired a large scale as a result of another major bankruptcy in 1780 (see Braudel 1973).⁸

Crises could then obtain the all-European scale largely because trade and economic relations in the Western (or rather, Atlantic) part of the World System had significantly increased and became more intense. Against this background it is hardly surprising that any market fluctuations in some region influence the others (see *e.g.*, Wirth 1883). It is no coincidence that the crises in the 19th century were called commercial/industrial, as they particularly quickly seized the whole commerce (which tends to depend heavily on credit). They became predominantly industrial not immediately; still there was a significant difference between the 18th and 19th centuries. In the 18th century, the crises were mainly trade-related ‘disorder of the credit’, that is a violation of trust in the credit sector, a result of failures in the functioning of the financial system. Before 1825, the industrial crises (of overproduction) were observed in the cotton-textile industry (Mendelson 1959, vol. 1), but they should be more likely considered local, and the normal cycle period had not yet emerged. Thus, there was a certain preparatory period, when the mechanism of K-waves had been formed.

The articles of the first section of the Yearbook are devoted to the study of this system of cycles in modern economic dynamics.

Leonid E. Grinin and Andrey V. Korotayev (‘The Interaction between Kondratieff Waves and Juglar Cycles’) analyze some important correlations between the medium-term economic cycles (7–11 years) and the long (40–60 years) Kondratieff cycles. The research into the history of this issue shows that this aspect is insufficiently studied. Meanwhile, it can significantly clarify both the reasons of alternation of upswing and downswing phases in K-waves and the reasons of a relatively stable length of these waves. It can also provide certain means for forecasting. The authors show that adjacent two-four medium cycles form a system whose important characteristic is the dynamics of economic trend. The latter can be upswing (active) or downswing (depressive). The mechanisms of formation of such medium-term trends and changing tendencies are explained in the article. The presence of such clusters of medium cycles (general duration of which is 20–30 years) determines to a large degree the long-wave dynamics and its timing characteristics. Thus, not medium-term J-cycles depend on the character of K-wave phase as Kondratieff supposed, but instead it is the character of the J-cycles cluster that significantly determines the character of the K-wave phase.

Philippe Jourdon (‘From Kuznets Theory to a New Global Governance, Using a Mathematical Concept of Relations between Wealth-Creating Kuznets

⁸ Then, however, crises became more frequent occurring every three to four years. For example, one can mention the crises of 1787–1788, 1793, 1797, 1803. But they were of a transitional type.

Cycles and a Kondratieff-Inspired System of Management') notes that debates on the significance of economic cycles proposed by Kuznets, Kondratieff, and Tugan-Baranovsky help to shape a unifying economic theory, the one that also borrows concepts, ideas, and models from neo-Marxist, monetarist, and other neo-classical schools of thought. These theories of economic cycles reveal a structure of economy which gives perspective to both economic statics and dynamics. In particular, the Kuznets cycles can contribute to forecasting a permanent new leadership in the global economy, while the Kondratieff cycles, by pointing to the existence of long periods of crisis, will make explicit the understanding of how they emerge from these long periods of crises. In combination, these insights will provide a top-down model of governance, which will include both global and institutional objectives. Jourdon further suggests that in order to allow for an empirical and theoretical convergence in using such a method we also have to learn from the European economic thought before the separation of economics and econometrics in the 1930s.

Finally, **Lucas Bernard, Aleksandr V. Gevorkyan, Tom Palley, and Willi Semmler** ('Long-Wave Economic Cycles: The Contributions of Kondratieff, Kuznets, Schumpeter, Kalecki, Goodwin, Kaldor, and Minsky') highlight the empirical and epistemological contributions made by the economists with respect to the cyclical nature of economic and social development. They examine the major mechanisms of economic cycles involving different time scales, with a particular focus on long-wave theory. The long-wave theories include Kondratieff's theory of cycles in production and relative prices; Kuznets' theory of cycles arising from infrastructure investments; Schumpeter's theory of cycles due to the waves of technological innovation; Keynes – Kaldor – Kalecki demand and investment oriented theories of cycles; Goodwin's theory of cyclical growth based on employment and wage share dynamics; and Minsky's financial instability hypothesis whereby capitalist economies show a genetic propensity to boom-bust cycles. The paper also discusses the methodological and empirical challenges involved in detecting long-duration cycles.

With respect to the interaction between different kinds of cycles as well as world-system perspective the article by **Arno Tausch** ('The Hallmarks of Crisis. A New Center-Periphery Perspective on Long Economic Cycles') is of special interest. The author provides the analysis, based on a variety of standard econometric techniques, aiming at a fairly comprehensive test of the hypotheses about long cycles, associated with the names of Kondratieff and Kuznets. Tausch's work, which takes up a recent approach by Barro (Barro and Ursua 2008; Barro, Nakamura, and Ursua 2011) tries to link the issue of long cycles with the issue of economic convergence and divergence in the World System, because there are very strong cyclical ups and downs of relative convergence in the world system in comparison to world averages or leading economies, and not just in terms of 'national' growth rates and 'national' economic cycles. Al-

ready the Japanese economist Kaname Akamatsu (1896–1974), who was a great admirer of Kondratieff, hinted at this connection. His most well-known tribute to Kondratieff (Akamatsu 1961) specifically linked the rise and decline of the global peripheries to the large Kondratieff cycle. In his contribution, Tausch attempts at establishing the empirical relationship between the Kondratieff cycles and the Akamatsu cycles, using advanced quantitative techniques with the Maddison data base, covering 31 countries. The Akamatsu cycles, analyzed in this work, are even stronger and seem to be more devastating than the ‘national waves’ and the global world systemic waves. There is a double-Tsunami wave structure of crises in the world economy. In addition, Tausch shows that the purchasing power shortfalls during the 2007 crisis were the largest in Japan, Italy, Denmark, France and Germany. His re-analysis of global cycles and national cycles as well as cycles of global convergence and divergence, has also revealed the existence of the 36-year Barro cycles and the 140-year Wallerstein cycles. For the first time in the literature, he also tries to analyze in a more systematic manner the cycles of convergence and divergence on a global level. Let us say a few words about the title of Tausch's article: the monolithic spirit of the day in Europe may maintain very uniformly that there is no alternative for the European periphery but to continue to be members of the Eurozone and to be subjected to the *phlebotomy* (bloodletting) of austerity packages under the auspices of the European Commission, while in reality the discovery of the organizing principles for rationalizing the complexities of the disease of stagnation and recession are being called for (in accordance with the path-breaking advances in cancer research, see Hanahan and Weinberg 2000, 2011). It is from cancer research, then, that we have taken the title: not the ‘hallmarks of cancer’, but the ‘hallmarks of economic crisis’ are on our agenda. These insights could one day include, like in medicine, sustaining future crisis signalling, getting to terms with economic growth suppressors, resisting the death of economic and social networks and agendas, especially in the most peripheral regions of Europe. The recognition of the widespread applicability of these concepts will, like in medicine, increasingly affect the development of new means to treat the ‘economic cancer’ of peripheral stagnation.

The last section of this Yearbook is devoted to the heritage of Nikolay Kondratieff and other prominent economists (we plan to make this section regular). Here we will publish articles both by Kondratieff himself and by other outstanding economists who explore the cycles, as well as the articles about Kondratieff and his successors. On the other hand, the year 2015 marks the 150th anniversary of an outstanding Russian economist, one of the most promi-

nent researchers of medium-term economic cycles, Mikhail Tugan-Baranovsky⁹, and the Yearbook is concluded with Kondratieff's article about him.

Another article in this section is by **Valentina Bondarenko** ('The Feat of Life and Creativity') and is devoted to Leonid Abalkin.¹⁰ Leonid Abalkin, who was the first President of the International Kondratieff Foundation (1992–2007), did incredibly much to bring the name and works of Nikolay Kondratieff back to the academic discourse in Russia as well as to collect and publish Kondratieff's scientific heritage.

References

- Akamatsu K. 1961.** A Theory of Unbalanced Growth in the World Economy. *Weltwirtschaftliches Archiv – Review of World Economics* 86(2): 196–217.
- Ayres R. U. 2006.** Did the Fifth K-Wave Begin in 1990–92? Has it been Aborted by Globalization? *Kondratieff Waves, Warfare and World Security* / Ed. by T. C. Devezas, pp. 57–71. Amsterdam: IOS Press.
- Barr K. 1979.** Long Waves: A Selective Annotated Bibliography. *Review* 2(4): 675–718.
- Barro R. J., and Ursúa J. F. 2008.** Macroeconomic Crises since 1870. *Brookings Papers on Economic Activity* 2008(1): 255–350.
- Barro R. J., Nakamura E., and Ursúa J. F. 2011.** *Crises and Recoveries in an Empirical Model of Consumption Disasters*. Cambridge, MA: Harvard University, Department of Economics.
- Bieshaar H., and Kleinknecht A. 1984.** Kondratieff Long Waves in Aggregate Output? An Econometric Test. *Konjunkturpolitik* 30(5): 279–303.
- Braudel F. 1973.** *Capitalism and Material Life, 1400–1800*. New York, NY: Harper and Row.
- Chase-Dunn C., and Grimes P. 1995.** World-Systems Analysis. *Annual Review of Sociology* 21: 387–417.
- Cleary M. N., and Hobbs G. D. 1983.** The Fifty Year Cycle: A Look at the Empirical Evidence. *Long Waves in the World Economy* / Ed. by Chr. Freeman, pp. 164–182. London: Butterworth.
- Comin D. A., and Hobijn B. 2009.** The CHAT Dataset. NBER Working Paper 15319, September. <http://www.Nber.org/papers/w15319>
- Dator J. 2006.** Alternative Futures for K-Waves. *Kondratieff Waves, Warfare and World Security* / Ed. by T. C. Devezas, pp. 311–317. Amsterdam: IOS Press.

⁹ Incidentally, concerning 2015, we should also mention another anniversary, namely 30 years since the death of Simon Kuznets (1901–1985).

¹⁰ Leonid I. Abalkin (1930–2011) became a director of the Institute of Economics of the USSR Academy of Sciences in 1986. He also worked as an advisor to Presidents Mikhail Gorbachev and Boris Yeltsin, and was the second-in-command of Premier Nikolai Ryzhkov's government. Under Gorbachev he was one of the major advocates of rapid economic reforms.

- Devezas T. C. (Ed.) 2006.** *Kondratieff Waves, Warfare and World Security*. Amsterdam: IOS Press.
- Devezas T. C. 2010.** Crises, Depressions, and Expansions: Global Analysis and Secular Trends. *Technological Forecasting and Social Change* 77(5): 739–761.
- Devezas T., and Corredine J. 2001.** The Biological Determinants of Long-wave Behaviour in Socioeconomic Growth and Development. *Technological Forecasting and Social Change* 68: 1–57.
- Devezas T., and Corredine J. 2002.** The Nonlinear Dynamics of Technoeconomic Systems. An Informational Interpretation. *Technological Forecasting and Social Change* 69: 317–357.
- Devezas T. C., Linstone H. A., and Santos H. J. S. 2005.** The Growth Dynamics of the Internet and the Long Wave Theory. *Technological Forecasting & Social Change* 72: 913–935.
- Dickson D. 1983.** Technology and Cycles of Boom and Bust. *Science* 219(4587): 933–936.
- Dosi G. 1984.** *Technical Change and Industrial Transformation*. NY: St. Martin's Press.
- Duijn J. J. van. 1979.** The Long Wave in Economic Life. *De Economist* 125(4): 544–576.
- Duijn J. J. van. 1981.** Fluctuations in Innovations over Time. *Futures* 13(4): 264–275.
- Eklund K. 1980.** Long Waves in the Development of Capitalism? *Kyklos* 33(3): 383–419.
- Ewijk C. van. 1982.** A Spectral Analysis of the Kondratieff Cycle. *Kyklos* 35(3): 468–499.
- Forrester J. W. 1978.** *Innovation and the Economic Long Wave*. MIT System Dynamics Group working paper. Cambridge, MA: MIT.
- Forrester J. W. 1981.** *The Kondratieff Cycle and Changing Economic Conditions*. MIT System Dynamics Group working paper. Cambridge, MA: MIT.
- Freeman C. 1987.** Technical Innovation, Diffusion, and Long Cycles of Economic Development. *The Long-Wave Debate* / Ed. by T. Vasko, pp. 295–309. Berlin: Springer.
- Freeman C., and Louçã F. 2001.** *As Time Goes By: From the Industrial Revolutions to the Information Revolution*. Oxford: Oxford University Press.
- Glazyev S. Yu. 1993.** *The Theory of Long-Term Technical Economic Development*. Moscow: VlaDar. In Russian (Глазьев С. Ю. Теория долгосрочного технико-экономического развития. М.: ВладДар).
- Glazyev S. Yu. 2009.** The Global Economic Crisis as a Process of Technological Shifts. *Voprosy ekonomiki* 3: 26–32. In Russian (Глазьев С. Ю. 2009. Мировой экономический кризис как процесс смены технологических укладов. *Вопросы экономики* 3: 26–32).
- Glismann H. H., Rodemer H., and Wolter W. 1983.** Long Waves in Economic Development: Causes and Empirical Evidence. *Long Waves in the World Economy* / Ed. by Ch. Freeman, pp. 135–163. London: Butterworth.

- Goldstein J.** 1988. *Long Cycles: Prosperity and War in the Modern Age*. New Haven, CT: Yale University Press.
- Gordon D. M.** 1978. Up and Down the Long Roller Coaster. *U.S. Capitalism in Crisis* / Ed. by B. Steinberg, pp. 22–34. New York: Economics Education Project of the Union for Radical Political Economics.
- Grinin L. E.** 2007a. Production Revolutions and Periodization of History: A Comparative and Theoretic-Mathematical Approach. *Social Evolution & History* 6(2): 11–55.
- Grinin L. E.** 2007b. Some Reflections Concerning the Nature of Laws Connected with Demographic Cycles (To the Raising of Question of Common Methodological Approaches to the Analysis of Demographic Cycles). *History and Mathematics: Conceptual Space and Courses of Search* / Ed. by P. V. Turchin, L. E. Grinin, S. Yu. Malkov, and A. V. Korotayev, pp. 219–246. Moscow: LKI/URSS. In Russian (Некоторые размышления по поводу природы законов, связанных с демографическими циклами (к постановке проблемы определения общих методологических подходов к анализу демографических циклов). *История и математика: «концептуальное пространство и направления поиска»* / Ред. П. В. Турчин, Л. Е. Гринин, С. Ю. Малков, А. В. Коротаев, с. 219–246. М.: ЛКИ/URSS).
- Grinin L. E.** 2010. The Verbal Model of Correlation between Long Kondratieff Waves and Medium-Term Juglar Cycles. *History and Mathematics: Analysis and Modeling of Global Economy* / Ed. by A. V. Korotayev, S. Yu. Malkov, and L. E. Grinin, pp. 44–111. Moscow: LIBROCOM/URSS. In Russian (Гринин Л. Е. Вербальная модель соотношения длинных кондратьевских волн и среднесрочных югларовских циклов. *История и математика: Анализ и моделирование глобальной динамики* / Ред. А. В. Коротаев, С. Ю. Малков, Л. Е. Гринин, с. 44–111. М.: Либроком/URSS).
- Grinin L. E.** 2012. *Macrohistory and Globalization*. Volgograd: 'Uchitel'.
- Grinin L. E.** 2013. Dynamics of K-waves in the Light of the Theory of Production Revolutions. *Kondratieff Waves: The Range of Views* / Ed. by L. E. Grinin, A. V. Korotayev, and S. Yu. Malkov, pp. 31–83. Volgograd: 'Uchitel'. In Russian (Гринин Л. Е. Динамика кондратьевских волн в свете теории производственных революций. *Кондратьевские волны: Палитра взглядов* / Ред. Л. Е. Гринин, А. В. Коротаев, С. Ю. Малков, с. 31–83. Волгоград: Учитель).
- Grinin L. E., and Grinin A. L.** 2013. Macroeolution of Technology. *Evolution: Development within Different Paradigms* / Ed. by L. E. Grinin, and A. V. Korotayev, pp. 143–178. Volgograd: 'Uchitel'.
- Grinin L. E., and Korotayev A. V.** 2012a. *Global Crisis in Retrospect: A Brief History of Rises and Crises; From Lycurgus to Alan Greenspan*. 2nd ed. Moscow: LIBROCOM. In Russian (Гринин Л. Е., Коротаев А. В. Глобальный кризис в ретроспективе. *Краткая история подъемов и кризисов: от Ликурга до Алана Гринспена*. 2-е изд. М.: ЛИБРОКОМ/URSS).
- Grinin L. E., and Korotayev A. V.** 2012b. *Cycles, Crises and Traps of the Modern World-System. The Study of Kondratieff, Juglar and Secular Cycles, Global Crises, Malthusian and Post-Malthusian Traps*. Moscow: LKI/URSS. In Russian (Гринин Л. Е., Коротаев А. В. Циклы, кризисы, ловушки современной мир-системы.

Исследование кондратьевских, жюгляровских и вековых циклов, глобальных кризисов, мальтузианских и постмальтузианских ловушек. М.: ЛИБРОКОМ/URSS).

Grinin L. E., and Korotayev A. V. 2014a. Interaction between Kondratieff Waves and Juglar Cycles. *Kondratieff Waves: Juglar – Kuznets – Kondratieff* / Ed. by L. E. Grinin, T. C. Devezas, and A. V. Korotayev, pp. 25–95. Volgograd: 'Uchitel'.

Grinin L. E., and Korotayev A. V. (Eds.) 2014b. Interaction between Long and Medium-term Cycles (Kondratieff Waves and Juglar Cycles). *Kondratieff Waves: Long and Medium-term Cycles*, pp. 15–73. Volgograd: 'Uchitel'. *In Russian* (Гринин Л. Е., Коротаев А. В. (Ред.). Взаимосвязь длинных и среднесрочных циклов (кондратьевских волн и жюгляровских циклов). *Кондратьевские волны: длинные и среднесрочные циклы*. Волгоград: Учитель.

Grinin L. E., Korotayev A. V., and Malkov, S. Yu. 2010. A Mathematical Model of Juglar Cycles and the Current Global Crisis. *History & Mathematics: Processes and Models of Global Dynamics* / Ed. by L. E. Grinin, A. Tausch, A. V. Korotayev, and P. Herrmann, pp. 138–187. Moscow: URSS.

Gruebler A. 1998. *Technology and Global Change*. Cambridge: Cambridge University Press.

Haberler, G. 1964 [1937]. Prosperity and Depression. Theoretical Analysis of Cyclical Movements. Cambridge, MA: Harvard University Press.

Habermas J. 1975. Towards a Reconstruction of Historical Materialism. *Theory and Society* 2(3): 287–300.

Hanahan D., and Weinberg R. A. 2000. The Hallmarks of Cancer. *Cell* 100(1): 57–70.

Hanahan D., and Weinberg R. A. 2011. Hallmarks of Cancer: The Next Generation. *Cell* 144(5): 646–674.

Hansen A. H. 1951. *Business Cycles and National Income*. NY: W. W. Norton.

Hirooka M. 2006. *Innovation Dynamism and Economic Growth. A Nonlinear Perspective*. Cheltenham – Northampton, MA: Edward Elgar.

Huntington S. 1991. *The Third Wave: Democratization in the Late Twentieth Century*. Norman – London: University of Oklahoma Press.

Ibn Khaldūn `Abd al-Rahman. 1958 [1377]. *The Muqaddimah: An Introduction to History*. NY: Pantheon Books (Bollingen Series, 43).

Kleinknecht A. 1981. Innovation, Accumulation, and Crisis: Waves in Economic Development? *Review* 4(4): 683–711.

Kleinknecht A., and van der Panne G. 2006. Who Was Right? Kuznets in 1930 or Schumpeter in 1939? *Kondratieff Waves, Warfare and World Security* / Ed. by T. C. Devezas, pp. 118–127. Amsterdam: IOS Press.

Kitchin J. 1923. Cycles and Trends in Economic Factors. *Review of Economics and Statistics* 5(1): 10–16.

Kondratieff N. D. 1922 [2002]. *The World Economy and its Conjunctures during and after the War*. Vologda: Regional Branch of the State Publishing House. *In Russian*

(Кондратьев Н. Д. *Мировое хозяйство и его конъюнктура во время и после войны*. Вологда: Областное отделение Государственного издательства).

Kondratieff N. D. 1925 [1993]. Long Cycles of Economic Conjuncture. *Selected Works* / Ed. by L. I. Abalkin, pp. 24–83. Moscow: Ekonomika. *In Russian* (Кондратьев Н. Д. Большие циклы конъюнктуры. *Избранные сочинения* / Ред. Л. И. Абалкин, с. 24–83. М.: Экономика).

Kondratieff N. D. 1935. The Long Waves in Economic Life. *The Review of Economic Statistics* 17(6): 105–115.

Kondratieff N. D. 1979. The Long Waves in Economic Life. *Review of Fernand Braudel Center* 2: 519–562.

Korotayev A. V. 2006. Долгосрочная политико-демографическая динамика Египта: циклы и тенденции. М.: Восточная литература.

Korotayev A. V. 2007a. Demographic Cycles and Social-Economic History of Russia, *Lichnost. Kultura. Obschestvo* 3(37): 380–385. *In Russian* (Коротаев А. В. Демографические циклы и социально-экономическая история России. *Личность. Культура. Общество* 3(37): 380–385).

Korotayev A. V. 2007b. About Some Features of Medieval Egyptian and Other Political and Demographical Cycles. *Vostok* 1 (2007): 5–15. *In Russian* (Коротаев А. В. О некоторых особенностях средневековых египетских и иных политико-демографических циклов. *Восток* 1: 5–15).

Korotayev A. V., and Grinin L. E. 2012. Kondratieff (K-) Waves in the World System Perspective. *Kondratieff Waves. Dimensions and Prospects at the Dawn of the 21st Century* / Ed. by L. Grinin, T. Devezas, and A. Korotayev, pp. 23–64. Volgograd: ‘Uchitel’.

Korotayev A. V., and Grinin L. E. 2014. Kondratieff Waves in the Global Studies Perspective. *Globalistics and Globalization Studies: Aspects and Dimensions of Global Views* / Ed. by L. Grinin, I. Ilyin, and A. Korotayev, pp. 65–98. Volgograd: ‘Uchitel’.

Korotayev A., and Khaltourina D. 2006. *Introduction to Social Macrodynamics: Secular Cycles and Millennial Trends in Africa*. Moscow: KomKniga/URSS.

Korotayev A., and Komarova N. 2004. A New Mathematical Model of Pre-Industrial Demographic Cycle. *Mathematical Modeling of Social and Economic Dynamics* / Ed. by M. G. Dmitriev, and A. P. Petrov, pp. 157–163. Moscow: Russian State Social University.

Korotayev A. V., Komarova N. L., and Khaltourina D. A. 2007. *Laws of History: Secular Cycles and Millennial Trends*. Moscow: URSS. *In Russian* (Коротаев А. В., Комарова Н. Л., Халтурина Д. А. *Законы истории. Вековые циклы и тысячелетние тренды*. М.: URSS).

Korotayev A., Malkov A., and Khaltourina D. 2006. *Introduction to Social Macrodynamics: Secular Cycles and Millennial Trends*. Moscow: KomKniga/URSS.

Korotayev A., Malkov S., and Grinin L. 2014. A Trap at the Escape from the Trap? Some Demographic Structural Factors of Political Instability in Modernizing Social

System. *History & Mathematics: Trends and Cycles* / Ed. by L. E. Grinin, and A. V. Korotayev, pp. 201–267. Volgograd: ‘Uchitel’ Publishing House.

Korotayev A., Zinkina J., Kobzeva S., Bozhevolnov J., Khaltourina D., Malkov A., and Malkov S. 2011. A Trap at the Escape from the Trap? Demographic-Structural Factors of Political Instability in Modern Africa and West Asia. *Clodynamics: The Journal of Theoretical and Mathematical History* 2(2): 276–303.

Kuznets S. 1930. *Secular Movements in Production and Prices. Their Nature and Their Bearing upon Cyclical Fluctuations*. Boston, MA: Houghton Mifflin Co.

Lazurenko S. 1992. The Problems of Long-Term Fluctuations of Economic Dynamics. *Voprosy Ekonomiki* 10: 69–75. In Russian (Лазуренко С. 1992. Проблемы долгосрочных колебаний экономической динамики. *Вопросы экономики* 10: 69–75).

Machiavelli N. 1996 [1531]. *Discourses on Livy*. Chicago, IL: University of Chicago Press.

Maevski V. I. 1997. *Introduction to Evolutionary Macroeconomics*. Moscow: Yaponiya segodnya. In Russian (Маевский В. И. Введение в эволюционную макроэкономику. М.: Япония сегодня).

Mandel E. 1975. *Late Capitalism*. London: New Left Books.

Mandel E. 1980. *Long Waves of Capitalist Development*. Cambridge: Cambridge University Press.

Marchetti C. 1980. Society as a Learning System: Discovery, Invention, and Innovations Cycles Revisited. *Technological Forecast and Social Change* 18: 257–282.

Marchetti C. 1986. Fifty Years Pulsation in Human Affairs. *Futures* 17(3): 376–388.

Mendelson, L. A. 1959–1964. *Theory and History of Economic Crises and Cycles*. Vols. 1–3. Moscow: Izdatelstvo sotsialno-ekonomicheskoi literatury. In Russian (Мендельсон Л. А. Теория и история экономических кризисов и циклов. Т. 1–3. М.: Издательство социально-экономической литературы).

Mensch G. 1979. *Stalemate in Technology – Innovations Overcome the Depression*. NY: Ballinger.

Modelski G. 1987. *Long Cycles in World Politics*. Seattle: University of Washington Press.

Modelski G. 2001. What Causes K-waves? *Technological Forecasting and Social Change* 68: 75–80.

Modelski G. 2006. Global Political Evolution, Long Cycles, and K-Waves. *Kondratieff Waves, Warfare and World Security* / Ed. by T. C. Devezas, pp. 293–302. Amsterdam: IOS Press.

Modelski G. 2008. Globalization as Evolutionary Process. *Globalization as Evolutionary Process* / Ed. by G. Modelski, W. R. Thompson, and T. Devezas, pp. 11–29. NY: Routledge.

Modelski G. 2012. Kondratieff (K-) Waves in the Modern World System. *Kondratieff Waves. Dimensions and Perspectives at the Dawn of the 21st Century* / Ed. by L. E. Grinin, T. C. Devezas, and A. V. Korotayev, pp. 65–76. Volgograd: ‘Uchitel’.

- Modelski G., and Thompson W. R. 1996.** *Leading Sectors and World Politics: The Coevolution of Global Politics and Economics*. Columbia, SC: University of South Carolina Press.
- Mogey R. 1992.** The Development of the Process of Long-Wave Fluctuations. *Voprosy Ekonomiki* 10: 76–78. In Russian (Моуги Р. Развитие процесса длинноволновых колебаний. *Вопросы экономики* 10: 76–78).
- Nefedov S. A. 2004.** A Model of Demographic Cycles in Traditional Societies: The Case of Ancient China. *Social Evolution & History* 3(1): 69–80.
- Nefiodow L. 1996.** *Der sechste Kondratieff. Wege zur Produktivität und Vollbeschäftigung im Zeitalter der Information*. 1 Auflage. Rhein-Sieg-Verlag: Sankt Augustin.
- Nisbet R. 1980.** *History of the Idea of Progress*. NY: Basic Books.
- O'Connor J. 2001.** *The Fiscal Crisis of the State*. Piscataway, NJ: Transaction Publishers.
- Pantin V. I. 1996.** *Cycles and Rhythms of History*. Ryazan: Araks Publisher. In Russian (Пантин В. И. Циклы и ритмы истории. Рязань: Аракс).
- Pantin V. I., and Lapkin V. V. 2006.** *Philosophy of Historical Prognosis: Rhythm of History and Prospects of World Development in the First Half of the 21st Century*. Dubna: Feniks+. In Russian (Пантин В. И., Лапкин В. В. Философия исторического прогнозирования: ритмы истории и перспективы мирового развития в первой половине XXI века. Дубна: Феникс+).
- Papenhausen Ch. 2008.** Causal Mechanisms of Long Waves. *Futures* 40: 788–794.
- Perez C. 2011.** *Technological Revolutions and Financial Capital. Dynamics of Bubbles and Periods of Prosperity*. Moscow: Delo. In Russian (Перес К. Технологические революции и финансовый капитал. Динамика пузырей и периодов процветания. М.: Дело).
- Polterovich V. 2009.** The Innovation Pause Hypothesis and the Strategy of Modernization. *Voprosy Ekonomiki* 6: 4–23.
- Rostow W. W. 1975.** Kondratieff, Schumpeter and Kuznets: Trend Periods Revisited. *Journal of Economic History* 25(4): 719–753.
- Rostow W. W. 1978.** *The World Economy: History and Prospect*. Austin, TX: University of Texas Press.
- Schumpeter J. A. 1939.** *Business Cycles. A Theoretical, Historical and Statistical Analysis of the Capitalist Process*. 2 Vols. NY – Toronto – London: McGraw-Hill Book Co.
- Senge P. M. 1982.** *The Economic Long Wave: A Survey of Evidence*. MIT System Dynamics Group working paper. Cambridge, MA: MIT.
- Thompson W. R., and Reuveny R. 2010.** *Limits to Globalization: North-South Divergence*. London: Routledge.
- Trotsky L. D. 1923.** The Curve of Capitalist Development. *Vestnik sotsialisticheskoy Akademii* 4. In Russian (Троцкий Л. Д. О кривой капиталистического развития. *Вестник Социалистической Академии* 4).

- Turchin P. 2003.** *Historical Dynamics: Why States Rise and Fall*. Princeton, NJ: Princeton University Press.
- Turchin P. 2005a.** Dynamical Feedbacks between Population Growth and Sociopolitical Instability in Agrarian States. *Structure and Dynamics* 1(1): 49–69.
- Turchin P. 2005b.** *War and Peace and War: Life Cycles of Imperial Nations*. NY: Pi Press.
- Turchin P., and Korotayev A. 2006.** Population Density and Warfare: A Reconsideration. *Social Evolution & History* 5(2): 121–158.
- Turchin P., and Nefedov S. 2009** *Secular Cycles*. Princeton, NJ: Princeton University Press.
- Tylecote A. 1992.** *The Long Wave in the World Economy*. London: Routledge.
- Wallerstein I. 1984.** Economic Cycles and Socialist Policies. *Futures* 16(6): 579–585.
- Wirth M. (Ed.) 1877.** *History of Trade Crises in England and America*. Saint-Petersburg: Znaniye. In Russian (Вирт М. История торговых кризисов в Европе и Америке. СПб.: Издательство журнала «Знание»).
- Wirth M. (Ed.) 1883.** *Geschichte der Handelskrisen*. 3 verm. und verb. Auflage. J.D. Sauerlander's Verlag.
- Yakovets Yu. V. 2001.** *N. D. Kondratieff Heritage: View from the 21st Century*. Moscow: MFK. In Russian (Яковец Ю. В. Наследие Н. Д. Кондратьева: взгляд из XXI века. М.: МФК).
- Zwan A. van der. 1980.** On the Assessment of the Kondratieff Cycle and Related Issues. *Prospects of Economic Growth* / Ed. by S. K. Kuipers, and G. J. Lanjouw, pp. 183–222. Amsterdam: North-Holland.